SEQUENCE LISTING

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<120> MANNOSIDASE STRUCTURES

<130> 12243.19USU1

<140> US 09/960,226
<141> 2001-09-21

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<151> 2001-01-23

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ctc ggg aga tct agc cac cat cat cat cat cac gga gaa ttc gac gat   96
Leu Gly Arg Ser Ser His His His His His His Gly Glu Phe Asp Asp
                20   25   30

cca ata aga cct cca ctt aaa gtg gct cgt tcc ccg agg cca ggg caa   144
Pro Ile Arg Pro Pro Leu Lys Val Ala Arg Ser Pro Arg Pro Gly Gln
            35   40   45

tgc caa gat gtg gtc caa gac gtg ccc aat gtg gat gta cag atg ctg   192
Cys Gln Asp Val Val Gln Asp Val Pro Asn Val Asp Val Gln Met Leu
        50   55   60

gag cta tac gat cgc atg tcc ttc aag gac ata gat gga ggc gtg tgg   240
Glu Leu Tyr Asp Arg Met Ser Phe Lys Asp Ile Asp Gly Gly Val Trp
65   70   75   80

aaa cag ggc tgg aac att aag tac gat cca ctg aag tac aac gcc cat   288
Lys Gln Gly Trp Asn Ile Lys Tyr Asp Pro Leu Lys Tyr Asn Ala His
                85   90   95

cac aaa cta aaa gtc ttc gtt gtg ccg cac tcg cac aac gat cct gga   336

1

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      His Lys Leu Lys Val Phe Val Val Pro His Ser His Asn Asp Pro Gly
              100                 105                 110

tgg att cag acg ttt gag gaa tac tac cag cac gac acc aag cac atc    384
Trp Ile Gln Thr Phe Glu Glu Tyr Tyr Gln His Asp Thr Lys His Ile
        115                 120                 125

ctg tcc aat gca cta cgg cat ctg cac gac aat ccc gag atg aag ttc    432
Leu Ser Asn Ala Leu Arg His Leu His Asp Asn Pro Glu Met Lys Phe
    130                 135                 140

atc tgg gcg gaa atc tcc tac ttt gct cgg ttc tat cac gat ttg gga    480
Ile Trp Ala Glu Ile Ser Tyr Phe Ala Arg Phe Tyr His Asp Leu Gly
145                 150                 155                 160

gag aac aaa aag ctg cag atg aag tcc att gta aag aat gga cag ttg    528
Glu Asn Lys Lys Leu Gln Met Lys Ser Ile Val Lys Asn Gly Gln Leu
                165                 170                 175

gaa ttg gaa ttt gtg act gga gga tgg gta atg ccg gac gag gcc aac    576
Glu Leu Glu Phe Val Thr Gly Gly Trp Val Met Pro Asp Glu Ala Asn
            180                 185                 190

tcc cac tgg cga aac gta ctg ctg cag ctg acc gaa ggg caa aca tgg    624
Ser His Trp Arg Asn Val Leu Leu Gln Leu Thr Glu Gly Gln Thr Trp
        195                 200                 205

ttg aag caa ttc atg aat gtc aca ccc act gct tcc tgg gcc atc gat    672
Leu Lys Gln Phe Met Asn Val Thr Pro Thr Ala Ser Trp Ala Ile Asp
        210                 215                 220

ccc ttc gga cac agt ccc act atg ccg tac att ttg cag aag agt ggt    720
Pro Phe Gly His Ser Pro Thr Met Pro Tyr Ile Leu Gln Lys Ser Gly
225                 230                 235                 240

ttc aag aat atg ctt atc caa agg acg cac tat tcg gtt aag aag gaa    768
Phe Lys Asn Met Leu Ile Gln Arg Thr His Tyr Ser Val Lys Lys Glu
                245                 250                 255

ctg gcc caa cag cga cag ctt gag ttc ctg tgg cgc cag atc tgg gac    816
Leu Ala Gln Gln Arg Gln Leu Glu Phe Leu Trp Arg Gln Ile Trp Asp
                260                 265                 270

aac aaa ggg gac aca gct ctc ttc acc cac atg atg ccc ttc tac tcg    864
Asn Lys Gly Asp Thr Ala Leu Phe Thr His Met Met Pro Phe Tyr Ser
            275                 280                 285

tac gac att cct cat acc tgt ggt cca gat ccc aag gtt tgc tgt cag    912
Tyr Asp Ile Pro His Thr Cys Gly Pro Asp Pro Lys Val Cys Cys Gln
        290                 295                 300

ttc gat ttc aaa cga atg ggc tcc ttc ggt ttg agt tgt cca tgg aag    960
Phe Asp Phe Lys Arg Met Gly Ser Phe Gly Leu Ser Cys Pro Trp Lys
305                 310                 315                 320

gtg ccg ccg cgt aca atc agt gat caa aat gtg gca gca cgc tca gat   1008
Val Pro Pro Arg Thr Ile Ser Asp Gln Asn Val Ala Ala Arg Ser Asp
                325                 330                 335

ctg ctg gtt gat cag tgg aag aag aag gcc gag ctg tat cgc aca aac   1056
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2

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Leu Leu Val Asp Gln Trp Lys Lys Lys Ala Glu Leu Tyr Arg Thr Asn
            340             345             350

gtg ctg ctg att ccg ttg ggt gac gac ttc cgc ttc aag cag aac acc      1104
Val Leu Leu Ile Pro Leu Gly Asp Asp Phe Arg Phe Lys Gln Asn Thr
            355             360             365

gag tgg gat gtg cag cgc gtg aac tac gaa agg ctg ttc gaa cac atc      1152
Glu Trp Asp Val Gln Arg Val Asn Tyr Glu Arg Leu Phe Glu His Ile
        370             375             380

aac agc cag gcc cac ttc aat gtc cag gcg cag ttc ggc aca ctg cag      1200
Asn Ser Gln Ala His Phe Asn Val Gln Ala Gln Phe Gly Thr Leu Gln
385             390             395             400

gaa tac ttt gat gca gtg cac cag gcg gaa agg gcg gga caa gcc gag      1248
Glu Tyr Phe Asp Ala Val His Gln Ala Glu Arg Ala Gly Gln Ala Glu
                405             410             415

ttt ccc acg cta agc ggt gac ttt ttc aca tac gcc gat cga tcg gat      1296
Phe Pro Thr Leu Ser Gly Asp Phe Phe Thr Tyr Ala Asp Arg Ser Asp
            420             425             430

aac tat tgg agt ggc tac tac aca tcc cgc ccg tat cat aag cgc atg      1344
Asn Tyr Trp Ser Gly Tyr Tyr Thr Ser Arg Pro Tyr His Lys Arg Met
            435             440             445

gac cgc gtc ctg atg cac tat gta cgt gca gca gaa atg ctt tcc gcc      1392
Asp Arg Val Leu Met His Tyr Val Arg Ala Ala Glu Met Leu Ser Ala
    450             455             460

tgg cac tcc tgg gac ggt atg gcc cgc atc gag gaa cgt ctg gag cag      1440
Trp His Ser Trp Asp Gly Met Ala Arg Ile Glu Glu Arg Leu Glu Gln
465             470             475             480

gcc cgc agg gag ctg tca ttg ttc cag cac cac gac ggt ata act ggc      1488
Ala Arg Arg Glu Leu Ser Leu Phe Gln His His Asp Gly Ile Thr Gly
                485             490             495

aca gca aaa acg cac gta gtc gtc gac tac gag caa cgc atg cag gaa      1536
Thr Ala Lys Thr His Val Val Val Asp Tyr Glu Gln Arg Met Gln Glu
                500             505             510

gct tta aaa gcc tgt caa atg gta atg caa cag tcg gtc tac cga ttg      1584
Ala Leu Lys Ala Cys Gln Met Val Met Gln Gln Ser Val Tyr Arg Leu
            515             520             525

ctg aca aag ccc tcc atc tac agt ccg gac ttc agt ttc ycg tac ttt      1632
Leu Thr Lys Pro Ser Ile Tyr Ser Pro Asp Phe Ser Phe Xaa Tyr Phe
            530             535             540

acg ctc gac gac tcc cgc tgg cca gga tct ggt gtg gag gac agt cga      1680
Thr Leu Asp Asp Ser Arg Trp Pro Gly Ser Gly Val Glu Asp Ser Arg
545             550             555             560

acc acc ata ata ctg ggc gag gat ata ctg ccc tcc aag cat gtg gtg      1728
Thr Thr Ile Ile Leu Gly Glu Asp Ile Leu Pro Ser Lys His Val Val
                565             570             575

atg cac aac acc ctg ccc cac tgg cgg gag cag ctg gtg gac ttt tat      1776
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3

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Met His Asn Thr Leu Pro His Trp Arg Glu Gln Leu Val Asp Phe Tyr
        580             585             590

gta tcc agt ccg ttt gta agc gtt acc gac ttg gca aac aat ccg gtg      1824
Val Ser Ser Pro Phe Val Ser Val Thr Asp Leu Ala Asn Asn Pro Val
        595             600             605

gag gct cag gtg tcc ccg gtg tgg agc tgg cac cac gac aca ctc aca      1872
Glu Ala Gln Val Ser Pro Val Trp Ser Trp His His Asp Thr Leu Thr
    610             615             620

aag act atc cac cca caa ggc tcc acc acc aag tac cgc atc atc ttc      1920
Lys Thr Ile His Pro Gln Gly Ser Thr Thr Lys Tyr Arg Ile Ile Phe
625             630             635             640

aag gct cgg gtg ccg ccc atg ggc ttg gcc acc tac gtt tta acc atc      1968
Lys Ala Arg Val Pro Pro Met Gly Leu Ala Thr Tyr Val Leu Thr Ile
            645             650             655

tcc gat tcc aag cca gag cac acc tcg tat gca tcg aat ctc ttg ctc      2016
Ser Asp Ser Lys Pro Glu His Thr Ser Tyr Ala Ser Asn Leu Leu Leu
            660             665             670

cgt aaa aac ccg act tcg tta cca ttg ggc caa tat ccg gag gat gtg      2064
Arg Lys Asn Pro Thr Ser Leu Pro Leu Gly Gln Tyr Pro Glu Asp Val
            675             680             685

aag ttt ggc gat cct cga gag atc tca ttg cgg gtt ggt aac gga ccc      2112
Lys Phe Gly Asp Pro Arg Glu Ile Ser Leu Arg Val Gly Asn Gly Pro
        690             695             700

acc ttg gcc ttt tcg gag cag ggt ctc ctt aag tcc att cag ctt act      2160
Thr Leu Ala Phe Ser Glu Gln Gly Leu Leu Lys Ser Ile Gln Leu Thr
705             710             715             720

cag gat agc cca cat gta ccg gtg cac ttc aag ttc ctc aag tat ggc      2208
Gln Asp Ser Pro His Val Pro Val His Phe Lys Phe Leu Lys Tyr Gly
            725             730             735

gtt cga tcg cat ggc gat aga tcc ggt gcc tat ctg ttc ctg ccc aat      2256
Val Arg Ser His Gly Asp Arg Ser Gly Ala Tyr Leu Phe Leu Pro Asn
            740             745             750

gga cca gct tcg cca gtc gag ctt ggc cag cca gtg gtc ctg gtg act      2304
Gly Pro Ala Ser Pro Val Glu Leu Gly Gln Pro Val Val Leu Val Thr
            755             760             765

aag ggc aaa ctg gag tcg tcc gtg agc gtg gga ctt ccg agc gtg gtg      2352
Lys Gly Lys Leu Glu Ser Ser Val Ser Val Gly Leu Pro Ser Val Val
        770             775             780

cac cag acg ata atg cgc ggt ggt gca cct gag att cgc aat ctg gtg      2400
His Gln Thr Ile Met Arg Gly Gly Ala Pro Glu Ile Arg Asn Leu Val
785             790             795             800

gat ata ggc tca ctg gac aac acg gag atc gtg atg cgc ttg gag acg      2448
Asp Ile Gly Ser Leu Asp Asn Thr Glu Ile Val Met Arg Leu Glu Thr
            805             810             815

cat atc gac agc ggc gat atc ttc tac acg gat ctc aat gga ttg caa      2496
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His Ile Asp Ser Gly Asp Ile Phe Tyr Thr Asp Leu Asn Gly Leu Gln
            820             825             830

ttt atc aag agg cgg cgt ttg gac aaa tta cct ttg cag gcc aac tat    2544
Phe Ile Lys Arg Arg Arg Leu Asp Lys Leu Pro Leu Gln Ala Asn Tyr
        835             840             845

tat ccc ata cct tcg ggt atg ttc att gag gat gcc aat acg cga ctc    2592
Tyr Pro Ile Pro Ser Gly Met Phe Ile Glu Asp Ala Asn Thr Arg Leu
    850             855             860

act ctc ctc acg ggt caa ccg ctg ggt gga tct tct ctg gcc tcg ggc    2640
Thr Leu Leu Thr Gly Gln Pro Leu Gly Gly Ser Ser Leu Ala Ser Gly
865             870             875             880

gag cta gag att atg caa gat cgt cgc ctg gcc agc gat gat gaa cgc    2688
Glu Leu Glu Ile Met Gln Asp Arg Arg Leu Ala Ser Asp Asp Glu Arg
                885             890             895

ggc ctg gga cag ggt gtt ttg gac aac aag ccg gtg ctg cat att tat    2736
Gly Leu Gly Gln Gly Val Leu Asp Asn Lys Pro Val Leu His Ile Tyr
            900             905             910

cgg ctg gtg ctg gag aag gtt aac aac tgt gtc cga ccg tca aag ctt    2784
Arg Leu Val Leu Glu Lys Val Asn Asn Cys Val Arg Pro Ser Lys Leu
        915             920             925

cat cct gcc ggc tat ttg aca agt gcc gca cac aaa gca tcg cag tca    2832
His Pro Ala Gly Tyr Leu Thr Ser Ala Ala His Lys Ala Ser Gln Ser
    930             935             940

ctg ctg gat cca ctg gac aag ttt ata ttc gct gaa aat gag tgg atc    2880
Leu Leu Asp Pro Leu Asp Lys Phe Ile Phe Ala Glu Asn Glu Trp Ile
945             950             955             960

ggg gca cag ggg caa ttt ggt ggc gat cat cct tcg gct cgt gag gat    2928
Gly Ala Gln Gly Gln Phe Gly Gly Asp His Pro Ser Ala Arg Glu Asp
                965             970             975

ctc gat gtg tcg gtg atg aga cgc tta acc aag agc tcg gcc aaa acc    2976
Leu Asp Val Ser Val Met Arg Arg Leu Thr Lys Ser Ser Ala Lys Thr
            980             985             990

cag cga gta ggc tac gtt ctg cac  cgc acc aat ctg atg  caa tgc ggc    3024
Gln Arg Val Gly Tyr Val Leu His  Arg Thr Asn Leu Met  Gln Cys Gly
        995             1000            1005

act cca  gag gag cat aca cag  aag ctg gat gtg tgc  cac cta ctg    3069
Thr Pro  Glu Glu His Thr Gln  Lys Leu Asp Val Cys  His Leu Leu
    1010            1015            1020

ccg aat  gtg gcg aga tgc gag  gcg acg acg ctg act  ttc ctg cag    3114
Pro Asn  Val Ala Arg Cys Glu  Ala Thr Thr Leu Thr  Phe Leu Gln
    1025            1030            1035

aat ttg  gag cac ttg gat ggc  atg gtg gcg ccg gaa  gtg tgc ccc    3159
Asn Leu  Glu His Leu Asp Gly  Met Val Ala Pro Glu  Val Cys Pro
    1040            1045            1050

atg gaa  acc gcc gct tat gtg  agc agt cac tca agc  tga              3198
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5

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Leu Gly Arg Ser Ser His His His His His His Gly Glu Phe Asp Asp
            20              25                  30


Pro Ile Arg Pro Pro Leu Lys Val Ala Arg Ser Pro Arg Pro Gly Gln
        35              40                  45


Cys Gln Asp Val Val Gln Asp Val Pro Asn Val Asp Val Gln Met Leu
    50              55                  60


Glu Leu Tyr Asp Arg Met Ser Phe Lys Asp Ile Asp Gly Gly Val Trp
65                  70              75                      80


Lys Gln Gly Trp Asn Ile Lys Tyr Asp Pro Leu Lys Tyr Asn Ala His
                85              90                  95


His Lys Leu Lys Val Phe Val Val Pro His Ser His Asn Asp Pro Gly
            100             105                 110


Trp Ile Gln Thr Phe Glu Glu Tyr Tyr Gln His Asp Thr Lys His Ile
        115             120                 125


Leu Ser Asn Ala Leu Arg His Leu His Asp Asn Pro Glu Met Lys Phe
    130             135                 140


Ile Trp Ala Glu Ile Ser Tyr Phe Ala Arg Phe Tyr His Asp Leu Gly
145             150             155                     160


Glu Asn Lys Lys Leu Gln Met Lys Ser Ile Val Lys Asn Gly Gln Leu
                165             170                 175
```

6

```
Glu Leu Glu Phe Val Thr Gly Gly Trp Val Met Pro Asp Glu Ala Asn
        180                 185                 190

Ser His Trp Arg Asn Val Leu Leu Gln Leu Thr Glu Gly Gln Thr Trp
        195                 200                 205

Leu Lys Gln Phe Met Asn Val Thr Pro Thr Ala Ser Trp Ala Ile Asp
    210                 215                 220

Pro Phe Gly His Ser Pro Thr Met Pro Tyr Ile Leu Gln Lys Ser Gly
225                 230                 235                 240

Phe Lys Asn Met Leu Ile Gln Arg Thr His Tyr Ser Val Lys Lys Glu
            245                 250                 255

Leu Ala Gln Gln Arg Gln Leu Glu Phe Leu Trp Arg Gln Ile Trp Asp
        260                 265                 270

Asn Lys Gly Asp Thr Ala Leu Phe Thr His Met Met Pro Phe Tyr Ser
        275                 280                 285

Tyr Asp Ile Pro His Thr Cys Gly Pro Asp Pro Lys Val Cys Cys Gln
    290                 295                 300

Phe Asp Phe Lys Arg Met Gly Ser Phe Gly Leu Ser Cys Pro Trp Lys
305                 310                 315                 320

Val Pro Pro Arg Thr Ile Ser Asp Gln Asn Val Ala Ala Arg Ser Asp
            325                 330                 335

Leu Leu Val Asp Gln Trp Lys Lys Lys Ala Glu Leu Tyr Arg Thr Asn
        340                 345                 350

Val Leu Leu Ile Pro Leu Gly Asp Asp Phe Arg Phe Lys Gln Asn Thr
        355                 360                 365

Glu Trp Asp Val Gln Arg Val Asn Tyr Glu Arg Leu Phe Glu His Ile
    370                 375                 380

Asn Ser Gln Ala His Phe Asn Val Gln Ala Gln Phe Gly Thr Leu Gln
385                 390                 395                 400

Glu Tyr Phe Asp Ala Val His Gln Ala Glu Arg Ala Gly Gln Ala Glu
            405                 410                 415
```

7

```
Phe Pro Thr Leu Ser Gly Asp Phe Phe Thr Tyr Ala Asp Arg Ser Asp
            420             425             430

Asn Tyr Trp Ser Gly Tyr Tyr Thr Ser Arg Pro Tyr His Lys Arg Met
            435             440             445

Asp Arg Val Leu Met His Tyr Val Arg Ala Ala Glu Met Leu Ser Ala
    450             455             460

Trp His Ser Trp Asp Gly Met Ala Arg Ile Glu Glu Arg Leu Glu Gln
465             470             475             480

Ala Arg Arg Glu Leu Ser Leu Phe Gln His His Asp Gly Ile Thr Gly
            485             490             495

Thr Ala Lys Thr His Val Val Val Asp Tyr Glu Gln Arg Met Gln Glu
            500             505             510

Ala Leu Lys Ala Cys Gln Met Val Met Gln Gln Ser Val Tyr Arg Leu
            515             520             525

Leu Thr Lys Pro Ser Ile Tyr Ser Pro Asp Phe Ser Phe Xaa Tyr Phe
    530             535             540

Thr Leu Asp Asp Ser Arg Trp Pro Gly Ser Gly Val Glu Asp Ser Arg
545             550             555             560

Thr Thr Ile Ile Leu Gly Glu Asp Ile Leu Pro Ser Lys His Val Val
            565             570             575

Met His Asn Thr Leu Pro His Trp Arg Glu Gln Leu Val Asp Phe Tyr
            580             585             590

Val Ser Ser Pro Phe Val Ser Val Thr Asp Leu Ala Asn Asn Pro Val
            595             600             605

Glu Ala Gln Val Ser Pro Val Trp Ser Trp His His Asp Thr Leu Thr
    610             615             620

Lys Thr Ile His Pro Gln Gly Ser Thr Thr Lys Tyr Arg Ile Ile Phe
625             630             635             640

Lys Ala Arg Val Pro Pro Met Gly Leu Ala Thr Tyr Val Leu Thr Ile
            645             650             655
```

8

Ser Asp Ser Lys Pro Glu His Thr Ser Tyr Ala Ser Asn Leu Leu Leu
        660   665   670

Arg Lys Asn Pro Thr Ser Leu Pro Leu Gly Gln Tyr Pro Glu Asp Val
        675   680   685

Lys Phe Gly Asp Pro Arg Glu Ile Ser Leu Arg Val Gly Asn Gly Pro
    690   695   700

Thr Leu Ala Phe Ser Glu Gln Gly Leu Leu Lys Ser Ile Gln Leu Thr
705   710   715   720

Gln Asp Ser Pro His Val Pro Val His Phe Lys Phe Leu Lys Tyr Gly
            725   730   735

Val Arg Ser His Gly Asp Arg Ser Gly Ala Tyr Leu Phe Leu Pro Asn
        740   745   750

Gly Pro Ala Ser Pro Val Glu Leu Gly Gln Pro Val Val Leu Val Thr
        755   760   765

Lys Gly Lys Leu Glu Ser Ser Val Ser Val Gly Leu Pro Ser Val Val
    770   775   780

His Gln Thr Ile Met Arg Gly Gly Ala Pro Glu Ile Arg Asn Leu Val
785   790   795   800

Asp Ile Gly Ser Leu Asp Asn Thr Glu Ile Val Met Arg Leu Glu Thr
            805   810   815

His Ile Asp Ser Gly Asp Ile Phe Tyr Thr Asp Leu Asn Gly Leu Gln
            820   825   830

Phe Ile Lys Arg Arg Arg Leu Asp Lys Leu Pro Leu Gln Ala Asn Tyr
        835   840   845

Tyr Pro Ile Pro Ser Gly Met Phe Ile Glu Asp Ala Asn Thr Arg Leu
    850   855   860

Thr Leu Leu Thr Gly Gln Pro Leu Gly Gly Ser Ser Leu Ala Ser Gly
865   870   875   880

Glu Leu Glu Ile Met Gln Asp Arg Arg Leu Ala Ser Asp Asp Glu Arg
            885   890   895

```
Gly Leu Gly Gln Gly Val Leu Asp Asn Lys Pro Val Leu His Ile Tyr
        900                 905             910


Arg Leu Val Leu Glu Lys Val Asn Asn Cys Val Arg Pro Ser Lys Leu
        915                 920             925


His Pro Ala Gly Tyr Leu Thr Ser Ala Ala His Lys Ala Ser Gln Ser
    930                 935             940


Leu Leu Asp Pro Leu Asp Lys Phe Ile Phe Ala Glu Asn Glu Trp Ile
945                 950             955                 960


Gly Ala Gln Gly Gln Phe Gly Gly Asp His Pro Ser Ala Arg Glu Asp
                965             970             975


Leu Asp Val Ser Val Met Arg Arg Leu Thr Lys Ser Ser Ala Lys Thr
            980             985             990


Gln Arg Val Gly Tyr Val Leu His  Arg Thr Asn Leu Met  Gln Cys Gly
        995             1000            1005


Thr Pro  Glu Glu His Thr Gln  Lys Leu Asp Val Cys  His Leu Leu
    1010            1015            1020


Pro Asn  Val Ala Arg Cys Glu  Ala Thr Thr Leu Thr  Phe Leu Gln
    1025            1030            1035


Asn Leu  Glu His Leu Asp Gly  Met Val Ala Pro Glu  Val Cys Pro
    1040            1045            1050


Met Glu  Thr Ala Ala Tyr Val  Ser Ser His Ser Ser
    1055            1060            1065


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<212>   PRT
<213>   Drosophila melanogaster

<400>   3

Arg Ser Ser His His His His His Gly Glu Phe Asp Asp Pro Ile
1               5                 10                15


Arg Pro Pro Leu Lys Val Ala Arg Ser Pro Arg Pro Gly Gln Cys Gln
            20                  25              30


Asp Val Val Asp Gln Val Pro Asn Val Asp Gln Met Leu Glu Leu Tyr
                            10
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Asp Arg Met Ser Phe Lys Asp Ile Asp Gly Gly Val Trp Lys Gln Gly
    50   55   60

Trp Asn Ile Lys Tyr Asp Pro Leu Lys Tyr Asn Ala His His Lys Leu
65   70   75   80

Lys Val Phe Val Val Pro His Ser His Asn Asp Pro Gly Trp Ile Gln
                85   90   95

Thr Phe Glu Glu Tyr Tyr Gln His Asp Thr Lys His Ile Leu Ser Asn
            100   105   110

Ala Leu Arg His Leu His Asp Asn Pro Glu Met Lys Phe Ile Trp Ala
        115   120   125

Glu Ile Ser Tyr Phe Ala Arg Phe Tyr His Asp Leu Gly Glu Asn Lys
    130   135   140

Lys Leu Gln Met Lys Ser Ile Val Lys Asn Gly Gln Leu Glu Phe Val
145   150   155   160

Thr Gly Gly Trp Val Met Pro Asp Glu Ala Asn Ser His Trp Arg Asn
            165   170   175

Val Leu Leu Gln Leu Thr Glu Gly Gln Thr Trp Leu Lys Gln Phe Met
            180   185   190

Asn Val Thr Pro Thr Ala Ser Trp Ile Asp Pro Phe Gly His Ser Pro
        195   200   205

Thr Met Pro Tyr Ile Leu Gln Lys Ser Gly Phe Lys Asn Met Leu Ile
    210   215   220

Gln Arg Thr His Tyr Ser Val Lys Lys Glu Leu Ala Gln Gln Arg Gln
225   230   235   240

Leu Glu Phe Leu Trp Arg Gln Ile Trp Asp Asn Lys Gly Asp Thr Ala
            245   250   255

Leu Phe Thr His Met Met Pro Phe Tyr Ser Tyr Asp Ile Pro His Thr
            260   265   270

Cys Gly Pro Asp Pro Lys Val Cys Cys Gln Phe Asp Phe Lys Arg Met

11

Gly Ser Phe Gly Leu Ser Cys Pro Trp Lys Val Pro Pro Arg Thr Ile
    290   295   300

Ser Asp Gln Asn Val Ala Ala Arg Ser Asp Leu Leu Val Asp Gln Trp
305   310   315   320

Lys Lys Lys Ala Glu Leu Tyr Arg Thr Asn Val Leu Leu Ile Pro Leu
            325   330   335

Gly Asp Asp Phe Arg Phe Lys Gln Asn Thr Glu Trp Asp Val Gln Arg
            340   345   350

Val Asn Tyr Glu Arg Leu Phe Glu His Ile Asn Ser Gln Ala His Phe
        355   360   365

Asn Val Gln Ala Gln Phe Gly Thr Gln Glu Tyr Phe Asp Ala Val His
    370   375   380

Gln Ala Glu Arg Ala Gly Gln Ala Ala Glu Phe Pro Thr Leu Ser Gly
385   390   395   400

Asp Phe Phe Thr Tyr Ala Asp Arg Ser Asp Asn Tyr Trp Ser Gly Tyr
            405   410   415

Tyr Thr Ser Arg Pro Tyr His Lys Arg Met Asp Arg Val Leu Met His
        420   425   430

Tyr Val Arg Ala Ala Glu Met Leu Ser Ala Trp His Ser Trp Asp Gly
        435   440   445

Met Ala Arg Ile Glu Glu Arg Leu Glu Gln Ala Arg Arg Glu Leu Ser
    450   455   460

Leu Phe Gln His His Asp Gly Ile Thr Gly Thr Ala Lys Thr His Val
465   470   475   480

Val Val Asp Tyr Glu Gln Arg Met Gln Glu Ala Leu Lys Ala Cys Gln
            485   490   495

Met Val Met Met Gln Gln Ser Val Tyr Arg Leu Leu Thr Lys Pro Ser
            500   505   510

Ile Tyr Ser Pro Asp Phe Ser Phe Ser Tyr Phe Thr Leu Asp Asp Ser

Arg Trp Pro Gly Ser Gly Val Glu Asp Ser Arg Thr Thr Ile Ile Leu
    530   535   540

Gly Glu Asp Ile Leu Pro Ser Lys His Val Val Met His Asn Thr Leu
545   550   555   560

Pro His Trp Arg Glu Gln Leu Val Asp Phe Tyr Val Ser Ser Pro Phe
                565   570   575

Val Ser Val Thr Asp Leu Ala Asn Asn Pro Val Glu Ala Gln Val Ser
            580   585   590

Pro Val Trp Ser Trp His His Asp Thr Leu Thr Lys Thr Ile His Pro
            595   600   605

Gln Gly Ser Thr Thr Lys Tyr Arg Ile Ile Phe Lys Ala Arg Val Pro
    610   615   620

Pro Met Gly Leu Ala Thr Tyr Val Leu Thr Ile Ser Lys Ser Lys Pro
625   630   635   640

Glu His Thr Ser Tyr Ala Ser Asn Leu Leu Leu Arg Lys Asn Pro Thr
                645   650   655

Ser Leu Pro Leu Gly Gln Tyr Pro Glu Asp Val Lys Phe Gly Asp Pro
                660   665   670

Arg Glu Ile Ser Leu Arg Val Gly Asn Gly Pro Thr Leu Ala Phe Ser
            675   680   685

Glu Gln Gly Leu Leu Lys Ser Ile Gln Leu Thr Gln Asp Ser Pro His
    690   695   700

Val Pro Val His Phe Lys Phe Leu Lys Tyr Gly Val Arg Ser His Gly
705   710   715   720

Asp Arg Ser Gly Ala Tyr Leu Phe Leu Pro Asn Gly Pro Ala Ser Pro
                725   730   735

Val Glu Leu Gly Gln Pro Val Val Leu Val Thr Lys Gly Lys Leu Glu
            740   745   750

Ser Ser Val Ser Val Gly Leu Pro Ser Val Val His Gln Thr Ile Met
                                    13

Arg Gly Gly Ala Pro Glu Ile Arg Asn Leu Val Asp Ile Gly Ser Leu
    770   775   780

Asp Asn Thr Glu Ile Val Met Arg Leu Glu Thr His Ile Asp Ser Gly
785   790   795   800

Asp Ile Phe Tyr Thr Asp Leu Asn Gly Leu Gln Phe Ile Lys Arg Arg
            805   810   815

Arg Leu Asp Lys Leu Pro Leu Gln Ala Asn Tyr Tyr Pro Ile Pro Ser
        820   825   830

Gly Met Phe Ile Glu Asp Ala Asn Thr Arg Leu Thr Leu Leu Thr Gly
        835   840   845

Gln Pro Leu Gly Gly Ser Ser Leu Ala Ser Gly Glu Leu Glu Ile Met
    850   855   860

Gln Asp Arg Arg Leu Ala Ser Asp Asp Glu Arg Gly Leu Gly Gln Gly
865   870   875   880

Val Leu Asp Asn Lys Pro Val Leu His Ile Tyr Arg Leu Val Leu Glu
            885   890   895

Lys Val Asn Asn Cys Val Arg Pro Ser Lys Leu His Pro Ala Gly Tyr
        900   905   910

Leu Thr Ser Ala Ala His Lys Ala Ser Gln Ser Leu Leu Asp Pro Leu
    915   920   925

Asp Lys Phe Ile Phe Ala Glu Asn Glu Trp Ile Gly Ala Gln Gly Gln
    930   935   940

Phe Gly Gly Asp His Pro Ser Ala Arg Glu Asp Leu Asp Val Ser Val
945   950   955   960

Met Arg Arg Leu Thr Lys Ser Ser Ala Lys Thr Gln Arg Val Gly Tyr
            965   970   975

Val Leu His Arg Thr Asn Leu Met Gln Cys Gly Thr Pro Glu Glu His
        980   985   990

Thr Gln Lys Leu Asp Val Cys His Leu Leu Pro Asn Val Ala Arg Cys

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Glu Arg Thr Thr Leu Thr Phe Leu Gln Asn Leu Glu His Leu Asp
    1010   1015   1020

Gly Met Val Ala Pro Glu Val Cys Pro Met Glu Thr Ala Ala Tyr
    1025   1030   1035

Val Ser Ser His Ser Ser
    1040

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<213> Homo sapiens

<400> 4

Leu Gln Glu Lys Ile Asp His Leu Glu Arg Leu Leu Ala Glu Asn Asn
1   5   10   15

Glu Ile Ile Ser Asn Ile Arg Asp Ser Val Ile Asn Leu Ser Glu Ser
            20   25   30

Val Val Glu Asp Gly Pro Lys Ser Ser Gln Ser Asn Phe Ser Gln Gly
        35   40   45

Ala Gly Ser His Leu Leu Pro Ser Gln Leu Ser Ser Val Asp Thr Ala
        50   55   60

Asp Cys Leu Phe Ala Ser Gln Ser Gly Ser His Asn Ser Asp Val Gln
65   70   75   80

Met Leu Asp Val Tyr Ser Leu Ile Ser Phe Asp Asn Pro Asp Gly Gly
                85   90   95

Val Trp Lys Gln Gly Phe Asp Ile Thr Tyr Glu Ser Asn Glu Trp Asp
            100   105   110

Thr Glu Pro Leu Gln Val Phe Val Val Pro His Ser His Asn Asp Pro
        115   120   125

Gly Trp Leu Lys Thr Phe Asn Asp Tyr Phe Arg Asp Lys Thr Gln Tyr
    130   135   140

Ile Phe Asn Asn Met Val Leu Lys Leu Lys Glu Asp Ser Arg Arg Lys
145   150   155   160

15

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Phe Ile Trp Ser Glu Ile Ser Tyr Leu Ser Lys Trp Trp Asp Ile Ile
            165                 170             175

Asp Ile Gln Lys Lys Asp Ala Val Lys Ser Leu Glu Asn Gly Gln Leu
            180                 185             190

Glu Ile Val Thr Gly Gly Trp Val Met Pro Asp Glu Ala Thr Pro His
            195                 200             205

Tyr Phe Ala Leu Ile Asp Gln Leu Ile Glu Gly His Gln Glu Leu Glu
    210                 215             220

Asn Asn Ile Gly Val Lys Pro Arg Ser Gly Trp Ala Ile Asp Pro Phe
225                 230             235                 240

Gly His Ser Pro Thr Met Ala Tyr Leu Leu Asn Arg Ala Gly Leu Ser
            245                 250                 255

His Met Leu Ile Gln Arg Val His Tyr Ala Val Lys Lys His Phe Ala
            260                 265             270

Leu His Lys Thr Leu Glu Phe Phe Trp Arg Gln Asn Trp Asp Leu Gly
            275                 280             285

Ser Val Thr Asp Ile Leu Cys His Met Met Pro Phe Tyr Ser Tyr Asp
    290                 295             300

Ile Pro Gly His Cys Gly Pro Asp Pro Lys Ile Cys Cys Gln Phe Asp
305                 310             315                 320

Phe Lys Arg Leu Pro Gly Gly Arg Phe Gly Cys Pro Gln Gly Val Pro
            325                 330             335

Pro Glu Thr Ile His Pro Gly Asn Val Gln Ser Arg Ala Arg Met Leu
            340                 345             350

Leu Asp Gln Tyr Arg Lys Lys Ser Lys Leu Phe Arg Thr Lys Val Leu
            355                 360             365

Leu Ala Pro Leu Gly Asp Asp Phe Arg Tyr Cys Glu Tyr Thr Glu Trp
    370                 375             380

Asp Leu Gln Phe Lys Asn Tyr Gln Gln Leu Phe Asp Tyr Met Asn Ser
385                 390             395                 400
                              16
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Gln Ser Lys Phe Lys Val Lys Ile Gln Phe Gly Thr Leu Ser Asp Phe
              405             410                 415

Phe Asp Ala Leu Asp Lys Ala Asp Glu Thr Gln Arg Asp Lys Ser Gly
          420             425                 430

Gln Ser Met Phe Pro Val Leu Ser Gly Asp Phe Phe Thr Tyr Ala Asp
          435             440                 445

Arg Asp Asp His Tyr Trp Ser Gly Tyr Phe Thr Ser Arg Pro Phe Tyr
      450             455                 460

Arg Lys Met Arg Asp Arg Ile Met Glu Ser His Leu Arg Ala Ala Glu
465             470                 475                 480

Ile Leu Tyr Tyr Phe Ala Leu Arg Gln Ala His Lys Tyr Lys Ile Asn
              485             490                 495

Lys Phe Leu Ser Ser Ser Leu Tyr Thr Ala Leu Thr Glu Arg Ala Arg
              500             505                 510

Asn Leu Gly Leu Phe Gln His His Asp Ala Ile Thr Gly Thr Ala Lys
          515             520                 525

Asp Trp Val Val Val Asp Tyr Gly Thr Arg Leu Phe His Ser Leu Met
      530             535                 540

Val Leu Glu Lys Ile Ile Gly Asn Ser Ala Phe Leu Leu Ile Gly Lys
545             550                 555                 560

Asp Lys Leu Thr Tyr Asp Ser Tyr Ser Pro Asp Thr Phe Leu Glu Met
              565             570                 575

Asp Leu Lys Gln Lys Ser Gln Asp Ser Leu Pro Gln Lys Asn Ile Ile
          580             585                 590

Arg Leu Ser Ala Glu Pro Arg Tyr Leu Val Val Tyr Asn Asn Pro Leu
          595             600                 605

Glu Gln Asp Arg Ile Ser Leu Val Ser Val Tyr Val Ser Ser Pro Thr
      610             615                 620

Val Gln Val Phe Ser Ala Ser Gly Lys Pro Val Glu Val Gln Val Ser
625             630                 635                 640

                                  17
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Ala Val Trp Asp Thr Ala Asn Thr Ile Ser Glu Thr Ala Tyr Glu Ile
              645                 650                 655

Ser Phe Arg Ala His Ile Pro Pro Leu Gly Leu Lys Val Tyr Lys Ile
              660                 665                 670

Leu Glu Ser Ala Ser Ser Asn Ser His Leu Ala Asp Tyr Val Leu Tyr
              675                 680                 685

Lys Asn Lys Val Glu Asp Ser Gly Ile Phe Thr Ile Lys Asn Met Ile
    690                 695                 700

Asn Thr Glu Glu Gly Ile Thr Leu Glu Asn Ser Phe Val Leu Leu Arg
705                 710                 715                 720

Phe Asp Gln Thr Gly Leu Met Lys Gln Met Met Thr Lys Glu Asp Gly
              725                 730                 735

Lys His His Glu Val Asn Val Gln Phe Ser Trp Tyr Gly Thr Thr Ile
              740                 745                 750

Lys Arg Asp Lys Ser Gly Ala Tyr Leu Phe Leu Pro Asp Gly Asn Ala
              755                 760                 765

Lys Pro Tyr Val Tyr Thr Thr Pro Pro Phe Val Arg Val Thr His Gly
    770                 775                 780

Arg Ile Tyr Ser Glu Val Thr Cys Phe Phe Asp His Val Thr His Arg
785                 790                 795                 800

Val Arg Leu Tyr His Ile Gln Gly Ile Glu Gly Gln Ser Val Glu Val
              805                 810                 815

Ser Asn Ile Val Asp Ile Arg Lys Val Tyr Asn Arg Glu Ile Ala Met
              820                 825                 830

Lys Ile Ser Ser Asp Ile Lys Ser Gln Asn Arg Phe Tyr Thr Asp Leu
              835                 840                 845

Asn Gly Tyr Gln Ile Gln Pro Arg Met Thr Leu Ser Lys Leu Pro Leu
    850                 855                 860

Gln Ala Asn Val Tyr Pro Met Thr Thr Met Ala Tyr Ile Gln Asp Ala
865                 870                 875                 880
                              18
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Lys His Arg Leu Thr Leu Leu Ser Ala Gln Ser Leu Gly Val Ser Ser
              885               890               895

Leu Asn Ser Gly Gln Ile Glu Val Ile Met Asp Arg Arg Leu Met Gln
              900               905               910

Asp Asp Asn Arg Gly Leu Glu Gln Gly Ile Gln Asp Asn Lys Ile Thr
              915               920               925

Ala Asn Leu Phe Arg Ile Leu Leu Glu Lys Arg Ser Ala Val Asn Thr
    930               935               940

Glu Glu Glu Lys Lys Ser Val Ser Tyr Pro Ser Leu Leu Ser His Ile
945               950               955               960

Thr Ser Ser Leu Met Asn His Pro Val Ile Pro Met Ala Asn Lys Phe
              965               970               975

Ser Ser Pro Thr Leu Glu Leu Gln Gly Glu Phe Ser Pro Leu Gln Ser
              980               985               990

Ser Leu Pro Cys Asp Ile His Leu  Val Asn Leu Arg Thr  Ile Gln Ser
         995              1000              1005

Lys Val  Gly Asn Gly His Ser  Asn Glu Ala Ala Leu  Ile Leu His
    1010              1015              1020

Arg Lys  Gly Phe Asp Cys Arg  Phe Ser Ser Lys Gly  Thr Gly Leu
    1025              1030              1035

Phe Cys  Ser Thr Thr Gln Gly  Lys Ile Leu Val Gln  Lys Leu Leu
    1040              1045              1050

Asn Lys  Phe Ile Val Glu Ser  Leu Thr Pro Ser Ser  Leu Ser Leu
    1055              1060              1065

Met His  Ser Pro Pro Gly Thr  Gln Asn Ile Ser Glu  Ile Asn Leu
    1070              1075              1080

Ser Pro  Met Glu Ile Ser Thr  Phe Arg Ile Gln Leu  Arg
    1085              1090              1095


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19

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<213> Drosophila melanogaster

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Gly Val Trp Lys Gln Gly
1   5

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Val Phe Val Val Pro His Ser His Asn Asp
1   5   10

<210> 7
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<212> PRT
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<400> 7

Trp Ala Ile Asp Pro Phe Gly His
1   5

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<213> Drosophila melanogaster

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His Met Met Pro Phe Tyr Ser Tyr Asp Ile Pro His Thr Cys Gly Pro
1   5   10   15

Asp Pro Lys Xaa Cys Cys Gln Phe Asp Phe Lys Arg
            20   25

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<212> PRT
<213> Drosophila melanogaster

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<223> Xaa = I or A

<400> 9

Leu Leu Xaa Pro Leu Gly Asp Asp Phe Arg
1   5   10